

CHAPTER 3

AFFECTED ENVIRONMENT

This section describes the affected environment of the BLM-administered public lands within the Northern and Eastern Mojave (NEMO) Routes planning area as it relates to the NEMO Routes of Travel project. A complete description of the resources can be found in the CDCA Plan and EIS, as well as the Proposed NEMO Plan and Final EIS (2002a), both of which are incorporated by reference (40 CFR 1502.21). The existing management situation for the planning area is summarized in Appendix K of the NEMO Final EIS (July 2002). A separate more detailed, existing management situation for the desert tortoise and the resource values and uses of its habitat in the NEMO planning area was prepared in April, 1998, (Foreman 1998) and is available for review at local BLM offices in Needles, Barstow, and Moreno Valley, California.

The NEMO Routes planning area is a large and diverse region in southeastern California¹ characterized by several north-south trending, parallel mountain ranges separated by narrow valleys in the north and by wide valleys in the south. The planning area is considered to contain parts of primarily the Mojave Desert, with a small portion of the Great Basin Desert. BLM-managed public lands in the planning area consist of three distinct and geographically separated regions.

The northernmost area of public lands includes those lands north and west of Death Valley National Park, and north of the Fort Irwin National Training Center. This area is the westernmost extent of the Great Basin mountain ranges and their valleys, including the Panamint Range, the Inyo Mountains, and the Argus Range. The mountain ranges are moderately to very steep, and the higher elevations tend to get more rain than Death Valley to the east. Although overall annual precipitation levels are still within the desert range, short-term flood flows are not unusual.

The central area of public lands includes those lands east and south of Death Valley National Park, between Nevada on the east and State Route 247 on the west, extending south to the peaks of the Kingston Range in a line approximately parallel to and about a mile south of the Inyo/San Bernardino County line. This is the Amargosa watershed, a complex of mountain ranges feeding into the Amargosa River and its tributaries to provide a desert oasis for wildlife and humans since prehistoric times. This area provides the first trails and settlements of men and women from the eastern United States seeking ranching and farming opportunities in Southern California.

The southern area of public lands includes those lands from the Kingston and Mesquite Range on the north, between Nevada on the east, and six miles east of Baker or the Mojave National Preserve on the west to highway I-40 on the south. In this area the valleys and mountains become more gently rolling; elevation rises gently upward from the Baker sink on the west to the Halloran Summit and then tapers down somewhat to the Nevada border. This is a country of wider open spaces, more and larger dry lakebeds, and somewhat more consistent, but still very low rainfall that generally results in good spring and fall vegetation growth. This is desert tortoise habitat. Primary land uses are grazing, mining, major transportation, and utility corridors. Within this southern area, routes have already been designated for routes within desert tortoise Areas of Critical Environmental Concern (Desert Wildlife Management Areas), and routes immediately adjacent within the NEMO Plan.

¹ The planning area also includes a very small portion of land in Nevada that is entirely within the Death Valley National Park (DVNP), which is described and analyzed in a separate planning document specific to DVNP.

The discussion of the affected environment is organized into the following sections: Resources, Uses, Special Designations and Regional Socioeconomic Considerations.

3.2 Resources

The resources in the affected environment are discussed in alphabetical order.

3.2.1 Air Quality

The Northern and Eastern Mojave planning area is located in two different air basins. These are the Great Basin Valley Air Basin and the Mojave Desert Air Basin. The Great Basin Valley Air Basin includes all of Inyo County. The Mojave Desert Air Basin is subdivided into the desert portions of San Bernardino County and Owens Valley.

Air quality throughout the Northern and Eastern Mojave planning area is generally fair, but large portions of the area are in non-attainment of the Clean Air Act based on infrequently exceeding the State and/or national ozone standard and the 24-hour standard for PM₁₀. The non-attainment areas do not meet air quality standards because of local generation of and/or long distance transportation of pollution to the area. Definitions used to determine whether an area meets air quality standards for health are found in the Federal Clean Air Act as Amended (1990), and associated national ambient air quality standards. There is also concern for visibility-reducing particles and PM₁₀ precursor emissions, including oxides of nitrogen (NO_x), oxides of sulfur (SO_x) and reactive organic gases (ROG) in most of Southern California, including the Northern and Eastern Mojave planning area.

Ozone Pollution

The only major contributing source of ozone in the planning area is motor vehicle emissions, but these emissions alone would not exceed federal ozone standards. Much of the ozone pollution in the desert has been transported from the Los Angeles air basin to the southwest and the San Joaquin Valley air basin to the northwest. National standards do not allow for subtraction of transported ozone in determining attainment/non-attainment status. State standards allow for the subtraction of transported ozone in determining attainment/non-attainment areas. However, state standards are more restrictive than federal standards that do not allow for transport as a factor. As a result, all of the planning area outside of Inyo County is in non-attainment of the California ozone standards, and the southern and western portions of the San Bernardino County areas are in “serious” non-attainment of the federal ozone standard.

PM₁₀ Pollution

Suspended particulate matter, PM₁₀, is the air pollutant of most concern in the Northern and Eastern Mojave Routes planning area. The EPA classified the San Bernardino County desert as a PM₁₀ non-attainment area on January 20, 1994. The State Implementation Plan was prepared and is under review.

PM₁₀ emissions are comprised of particulate material less than 10 microns in diameter. PM₁₀ is a mixture of substances including elemental carbon, lead and nickel, compounds such as nitrates, organics and sulfates and complex mixtures such as diesel exhaust and soil. Ambient PM₁₀ in the air comes from direct and precursor emission sources. Direct emissions are PM₁₀ particles emitted directly from the source.

Many PM₁₀ precursors are emitted as gases and form into particles in the atmosphere downwind from the source.

One of the reasons for the concern with PM₁₀ emissions is their adverse effect on human health. Particles below 2.5 microns in size are termed fine particles (sometimes listed as PM_{2.5}), and those from 2.5 to 10 microns in size are coarse particles. All of the PM₁₀ particles can be inhaled, and tend to deposit in the air sacs of the lungs. The fine particles are generated primarily from precursor emissions, and many are toxic or carcinogenic. Fugitive dust mostly consists of coarse particles that are not as likely to contain toxic materials.

PM₁₀ in the atmosphere can be caused by natural factors and human activities. In the planning area, human activities primarily contribute to direct PM₁₀ emissions through fugitive dust generation. These human activities include construction, excavation and demolition, off-highway vehicle (OHV) travel, wind action on unpaved roads and other denuded areas such as parking lots, dust from moving vehicles associated with unpaved and paved roads, OHV open areas and military activities, and in a few cases, industrial activities.

National PM₁₀ standards are considered to be a level at which the whole population would have health effects from PM₁₀. State standards are considered public health goals, and have been set at a level where the elderly, the very young and those with other respiratory illnesses would be affected. Nearly all of the NEMO Routes planning area has recorded concentrations of PM₁₀ in excess of the national and state ambient air quality standards for PM₁₀ emissions. EPA has classified two areas in the planning area as federal non-attainment areas. They are the Owens Valley PM₁₀ planning area, classified as “serious”, and the general San Bernardino County area, classified as “moderate”.

All federal actions within air quality district areas that have been designated as “moderate”, such as San Bernardino County, must make a determination of federal conformity. Then reasonably available control measures (RACM) are implemented for activities/sources, including existing sources, unless their effect on PM₁₀ emissions is insignificant (below de minimus levels). The Owens Valley PM₁₀ State Implementation Plan area includes portions of the Northern and Eastern Mojave Routes planning area east of Darwin. The primary source of PM₁₀ emissions in this area is wind erosion dust from Owens Dry Lake. The objective of the PM₁₀ plan is to reduce Owens Lake emissions and work through the permit process for any new possible emission sources.

Visibility Reducing Particles (VRP)

The planning area is currently unclassified for visibility reducing particles under both national and state ambient air standards, and many VRP are transported from outside the planning area. Reduced atmospheric visibility results mainly from suspended particles. Particles between 0.1 and 1.5 microns diameter are the most effective in reducing visibility. This range of particle sizes is a subset of the fine PM₁₀ particles. Soot particles in particular are effective in reducing visibility. Small nitrate and sulfate particles may also substantially reduce visibility. Nitrogen dioxide and water droplets can reduce visibility. Many of the VRP form in the atmosphere downwind from sources of emissions.

3.2.2 Biological Resources - Vegetation

Most of the vegetation of the planning area can be classified within creosote bush/white bursage, creosote bush scrub, mixed saltbush, Joshua tree, blackbrush, and Mojave yucca vegetation series. Fremont cottonwood, mixed willow, black willow, and water birch series do not cover large areas, but the structure

and variety of plants and the variety of animals found in these series make them a significant resource to maintain. As general references to vegetation sections of this Chapter, please refer to the CDCA Plan, (USBLM 1980), Hickman (1993), and the California Native Plant Society (2001).

The NEMO Routes planning area contains a number of Unusual Plant Assemblages (UPA) designated in the CDCA Plan for emphasis in the environmental review process and for special monitoring attention. The Proposed Action is consistent with protection and enhancement of UPA; all riparian systems in the (CDCA) are classified as UPA. UPA are stands of vegetation within the CDCA that can be recognized as extraordinary due to factors such as wildlife value, unusual ages, size, unusually high cover or density, or disjunction from main centers of distribution. By definition, vegetation associated with water, such as seeps, springs, or riparian areas are examples of this type of association. UPA in areas affected by the planning effort include Salt and Brackish Marsh (near Carson Slough), and Riparian and River Bottomland along the Amargosa River and in the Inyo Mountains and Panamint Range.

Special Status Plants

Two federally listed plant species, the endangered Amargosa niterwort (*Nitrophilia mohavensis*) and the threatened Ash Meadows gumplant (*Grindelia fraxino-pratensis*), are known to occur on BLM lands in the planning area. Critical habitat has been designated for both species in the Carson Slough area. The two critical habitat units are separated by a 1.2 mile-wide stretch of public lands, and both units, as well as the area between these units, are suspected to support the federally listed threatened spring-loving centaury (*Centaurium namophilum*). In addition, two other state-listed plant species and 23 BLM California sensitive plant species occur or potentially occur in the NEMO planning area. See Appendix I of the NEMO Proposed Northern and Eastern Mojave Desert Management Plan and FEIS (BLM 2002a) for a complete list of the special status plant species.

The Clark Range, Kingston Range and Mesquite Mountain, as well as the Amargosa River Basin and Lower Carson Slough are focal areas for a number of special status plants. Additionally, several High Sierran-influenced canyons and peaks in the Inyo and Panamint Mountains, notably Pleasant and Wildrose Canyons in the latter range, and around the Cerro Gordo Peak area, in the former mountain range, contain an unusually high number of special status plants (Sawyer and Keeler-Wolf 1995). For further information contact John Willoughby, State Botanist for BLM 2800 Cottage Way Room W-1834, Sacramento, CA.

The Multiple Use Class Moderate (MUC M) designated area at the south end of the Inyo Mountains contains several special status plant species, including: Inyo hulsea (*Hulsea vestita* ssp *inyoensis*) and Jaeger's caulostramina (*Caulostramina jaegeri*). Additionally, the Panamint Mountains lupine (*Lupinus magnificus* var. *magnificus*) is known from a MUC M area in the Panamint Mountains. Other special status plant species are thought to occur in this area as well.

Riparian-Wetland Vegetation

Riparian communities occur near desert springs and along flowing streams and are of special interest. Under the CDCA Plan, all riparian areas in the planning area are designated as Unusual Plant Assemblages (UPA), which are to be given special consideration in management decisions.

The amount of scientific data and history of BLM-managed wetland habitats varies greatly by location. The best information available on wetland habitats for this EA is Functioning Condition Assessment data (See Appendix J, NEMO Plan July 2002). There are three categories of functioning condition: 1) proper

functioning, 2) functioning-at-risk, and 3) non-functional. Detailed definitions of these categories are available in BLM's Technical References 1737-9 (USBLM 1993) and 1737-11 (USBLM 1994).

Many of the desert spring riparian areas within the NEMO Routes planning area have been rated as non-functional or functioning-at-risk, primarily resulting from water diversion, weed establishment, vehicle use, mining, burro use or livestock grazing (Refer to Appendix J). Many riparian riverine segments have similarly been rated as functioning-at-risk due to upstream water use, groundwater overdraft and/or exotic plant establishment (Tamarisk/saltcedar or *Tamarix ramosissima*).

A number of weeds are of concern in the planning area. Mustards and thistles are present and take advantage of favorable weather conditions. Tree of heaven (*Ailanthus altissima*) and African rue (*Peganum harmala*) are known to occur in a few sites, and probably elsewhere. Depending weather conditions, filaree (*Erodium cicutarium*), red brome (*Bromus rubens*), and Mediterranean split grass (*Schismus barbatus*) can be found throughout the planning area in varying densities. Black locust (*Robinia pseudoacacia*) and honey locust (*Gleditsia triacanthos*) infest spring-fed riparian areas in the same manner as tree of heaven, greatly impacting critical riparian areas, and replace native vegetation. Both are known to occur at many old mining sites. Halogeton (*Halogeton glomeratus*) infests a small area on either side of Interstate 15 several miles east of the rest stop in Shadow Valley and it appears not to be spreading. Tamarisk (salt cedar - *T. ramosissima*) is of great concern because it easily spreads in riparian or wetland areas and if not treated with prescribed burning, mechanical methods, or herbicides, it will eventually be the only vegetation to occupy the site. Athel tree (*Tamarix aphylla*) is not considered an invasive species, but can cause problems at spring sites due to the tremendous amount of water it absorbs and transpires. This has been a problem at several sensitive fish habitats. Other than tamarisk, most weed control efforts have been limited in general because weeds take advantage of wetter years and native plants appear to have the advantage during drier years.

3.2.3 Biological Resources - Wildlife

A complex combination of soil types, topography, vegetative communities and climatic conditions found in the planning area supports numerous wildlife habitats and many endemic (i.e., found only here) animal species. The area is well known for its species diversity, particularly reptiles, neotropical migratory birds, small mammals and aquatic insects. Major wildlife habitats or special habitat features, in addition to the plant communities listed previously, include: sand dunes, rocky outcrops, talus slopes, cliffs, mineshafts, adits, streams, and spring pools.

Over 35 reptile species are known to occur within planning area, with representative species including the western whiptail lizard (*Cnemidophorus tigris*), zebra-tailed lizard (*Callisaurus draconoides*), side-blotched lizard (*Uta stansburiana*), desert iguana (*Dipsosaurus dorsalis*), chuckwalla (*Sauromalus obesus*), sidewinder rattlesnake (*Crotalus cerastes*) and speckled rattlesnake (*Crotalus mitchelli*). Seven amphibian species are also known to inhabit some of the springs, streams and moist areas found in the planning area. These include the Inyo Mountains' slender salamander (*Batrachoseps campi*), red-spotted toad (*Bufo punctatus*), western toad (*Bufo boreas*), Great Basin spadefoot toad (*Scaphiopus intermontanus*), Pacific tree frog (*Hyla regilla*), leopard frog (*Rana pipiens*) and bullfrog (*Rana catesbeiana*). However, the latter species is an introduced, non-native species. The presence of an eighth species, the Amargosa Toad (*Bufo boreas nelsoni*) is also suspected.

The varied habitats which occur also support over 150 avian species, most of which are classified as neotropical migratory birds. Some habitats support both nesting and migratory use, whereas others, particularly riparian areas, support extensive migratory use.

Horned lark (*Eremophila alpestris*), greater roadrunner (*Geococcyx californianus*), Le Contes thrasher (*Toxostoma lecontei*), black-throated sparrow (*Amphispiza bilineata*) and common raven (*Corvus corax*) are known to occur throughout the planning area, particularly in creosote bush (*Larrea tridentata*) scrub, and Joshua tree (*Yucca brevifolia*) plant communities. Phainopepla (*Phainopepla nitens*), yellow warbler (*Dendroica petechia*), verdin (*Auriparus flaviceps*) and Gambel's quail (*Callipepla gambelii*) are common to mesquite bosque forests (*Prosopis* spp.) in the region; whereas northern flicker (*Colaptes auratus*), blue grosbeak (*Guiraca caerulea*), ladder-backed woodpecker (*Picoides scalaris*), ash-throated flycatcher (*Myiarchus cinerascens*) and western kingbird (*Tyrannus verticalis*) frequent willow (*Salix* spp.) and cottonwood (*Populus fremontii*) dominated riparian areas.

Bewick's wren (*Thryomanes bewickii*), blue-gray gnatcatcher (*Polioptila caerulea*) and long-eared owl (*Asio otus*) are also known from wash habitats that support heavy shrub cover, whereas Say's phoebe (*Sayornis saya*), rock wren (*Salpinctes obsoletus*) and canyon wren (*Catherpes mexicanus*) are common in to less vegetated canyons. Foothill areas supporting pinyon (*Pinus monophylla*) and juniper (*Juniperus* spp.) stands support birds such as bushtit (*Psaltiriparus minimus*), yellow-rumped warbler (*Dendroica coronata*), scrub jay (*Aphelocoma coerulescens*) and pinyon jay (*Gymnorhinus cyanocephalus*). In forested mountains, the white-breasted nuthatch (*Sitta pygmaea*), mountain chickadee (*Parus gambeli*), Townsend's solitaire (*Myadestes townsendi*) and great horned owl (*Bubo virginianus*) are known to occur. Raptors with large territories, such as prairie falcon (*Falco mexicanus*) and golden eagle (*Aquila chrysaetos*), can range over all these habitats, but suitable nesting sites are usually limited to cliff and canyon areas.

Numerous small mammals also exist in the planning area. Representative species include canyon, cactus and deer mice (*Peromyscus* spp.), Botta's pocket gopher (*Thomomys bottae*), antelope ground squirrel (*Ammospermophilus leucurus*) and round-tailed ground squirrel (*Spermophilus tereticaudus*), kangaroo rats (*Dipodomys* spp.), pocket mice (*Perognathus* spp.), black-tailed hare (*Lepus californicus*), as well as desert cottontail (*Sylvilagus audubonii*). Large mammals common to the region include badger (*Taxidea taxus*), ringtail (*Bassariscus astutus*), kit fox (*Vulpes macrotis*), bobcat (*Felis rufus*), coyote (*Canis latrans*), mountain lion (*Felis concolor*) and mule deer (*Odocoileus hemionus*).

Special Status Animals

State and federally listed animals found on public lands in the planning area include the following:

- State and federally threatened desert tortoise (*Gopherus agassizii*);
- State and federally endangered Amargosa vole (*Microtus californicus scirpensis*);
- State and federally endangered least bells vireo (*Vireo bellii pusillus*);
- State and federally endangered southwestern willow flycatcher (*Empidonax trailli extimus*);
- State endangered and federally threatened Inyo California towhee (*Pipilo crissalis eremophila*);
- State endangered western yellow-billed cuckoo (*Coccyzus americanus occidentalis*);
- State threatened Mohave ground squirrel (*Spermophilus mohavensis*); and
- State threatened Swainson's hawk (*Buteo swainsoni*).

Several BLM-designated sensitive wildlife species also occur within the planning area. Sensitive wildlife species are generally associated with specialized habitats, such as desert bighorn sheep (*Ovis canadensis nelsoni*) in their preferred mountainous terrain; mineshaft, cliff and rock crevice-dwelling animals (eight bat species) and their extensive habitat in the planning area; western burrowing owl (*Athene cunicularia*);

hypogaea) and mixed Mojave woody scrublands or creosote bush scrublands; Amargosa River and tributary riparian-obligate species, such as the Amargosa pupfish (*Cyprinodon nevadensis amargosae*) and the Amargosa speckled dace (*Rhinichthys osculus amargosae*); the Mojave fringe-toed lizard (*Uma scoparia*), and its limited sand dune habitat; Gila monster (*Heloderma suspectum*), and its patchy succulent scrub-canyon habitat, and the endemic Shoshone cave whip-scorpion (*Trithyreus shoshonensis*) and its unique subterranean habitat. The sources of water at Antelope Springs and Deep Springs Lake (actually a group of springs- see discussion under “water”), which are on private land are known to be inhabited by the black toad; whether black toads use the downstream habitat on adjacent BLM lands is not known.

See Appendix I of the NEMO Proposed Plan and FEIS (July 2002) for a complete description of listed, sensitive and special concern species occurring within the NEMO Routes planning area. A complete list of known species which occur within the planning area is found in the California Desert Conservation Area Plan, Final Environmental Impact Statement and Proposed Plan, Appendix IX: Wildlife and Appendix X: Vegetation (USBLM 1980).

The remainder of the discussion of biological resources focuses on specific listed or sensitive species affected by one or more alternatives. Some of the NEMO route closure or limitation proposals are specifically aimed at addressing the needs of rare or declining species.

Desert Tortoise

The desert tortoise is found throughout arid lands of the southwest United States in Arizona, California, Nevada, Utah and northern Mexico. The species has two distinct populations, referred to as the Mojave and Sonoran populations, effectively separated by the Colorado River.

Data from a variety of sources indicate that there are at least six ecologically significant units of the desert tortoise within the Mojave region. These units (hereafter referred to as Recovery Units) consist of populations or groups of populations that show significant differences in genetics, morphology, ecology, or behavior. The four Recovery Units occurring in the CDCA include the Western Mojave, Eastern Mojave, Northern Colorado Desert, and Eastern Colorado Desert Recovery Units. The Eastern Mojave Recovery Unit, addressed in the NEMO plan amendments, lies east of Death Valley and extends in the north from the Nevada border southward to Interstate Highway I-40. The small portion of the Northeastern Mojave Recovery Unit in Ivanpah Valley is included in the Eastern Mojave Recovery Unit in this document.

Desert tortoises spend much of their lives in burrows, emerging to feed and mate during late winter and early spring. They typically remain active through the spring, and sometimes emerge again after summer storms. During these activity periods, desert tortoises eat a wide variety of herbaceous vegetation, particularly grasses and the flowers of annual plants (Luckenbach 1982). Eggs and young are quite vulnerable to predation due to their small size and soft shells. Adults, however, are well protected against most predators other than humans and other environmental hazards and consequently are long-lived. (Germano 1992, Turner et al. 1987).

In adverse conditions the desert tortoise retreats to burrows or caves, at which time they reduce their metabolism and loss of water and consume very little food. Adult desert tortoises lose water at such a slow rate that they can survive for more than a year without access to free water of any kind (USFWS 1994a, p. 18). Desert tortoises apparently tolerate large imbalances in their water and energy budgets (Nagy and Medica 1986). This ability enables them to survive lean years and exploit resources that are only periodically available. During years of average, or better than average precipitation and forage

production, desert tortoises can balance their water budgets and have a positive energy balance, providing opportunity for growth and reproduction (Nagy and Medica 1986).

Habitat requirements include sufficient suitable plants for forage and cover, and suitable substrates for burrow and nest sites. Throughout most of the Mojave region, desert tortoises occur primarily on flats and bajadas with soils ranging from sand to sandy gravel, characterized by scattered shrubs and abundant intershrub space for the growth of herbaceous plants. Desert tortoises are also found on rocky terrain and slopes in parts of the Mojave region (USFWS 1994a, p.15).

It is estimated that many desert tortoise populations have declined at rates ranging between 3 and 59 % per year (Berry 1990, as amended). These declines have been attributed to direct take by humans (e.g., collection for pets or food, shooting, killing and injuring with motor vehicles). Habitat loss, degradation, and fragmentation due to roads, agriculture, residential development, military training, diseases and recent drought are other decline factors (Sievers et al. 1988, Luckenbach 1982, Coombs 1977a and b, Appendix D). Populations in areas with a high incidence of known human-caused mortality exhibit the greatest declines (USFWS 1994a, p.3). In the Planning area, declines up to 90% have been recorded at the Goffs permanent study plot in Fenner Valley (K.H. Berry, USGS, desert tortoise researcher, pers. comms. 2000-2002.).

In 1989, the Fish and Wildlife Service listed the desert tortoise – Mojave population - as an endangered species on an emergency basis (USFWS 1989). The Mojave population was subsequently listed as threatened on April 2, 1990 (USFWS 1990).

Critical habitat essential to achieve recovery was identified by USFWS in 1994. Portions of the Ivanpah Critical Habitat Unit and Piute-El Dorado Critical Habitat Unit occur in the planning area (Fig. 6a). BLM has designated tortoise habitat categories. Category I habitat within the Planning Unit occurs in Shadow Valley, Ivanpah Valley, and the Piute and Fenner Valleys (Fig 6a). BLM's goal for Category I desert tortoise habitat is to maintain a viable population of tortoises. All other tortoise habitat in the planning area (e.g., Pahrump Valley) is BLM Category III desert tortoise habitat. The management goal is to mitigate impacts to the extent possible.

There is a large body of literature analyzing the threats to desert tortoise populations. Table 1 in the Desert Tortoise (Mojave Population) Recovery Plan lists many of the references up to 1994 on the direct and indirect effects of human activities, off-highway vehicles, and livestock grazing on tortoises and tortoise habitat (USFWS 1994, p. 5). Boarman (1999) reviewed the literature on threats to the desert tortoise.

Amargosa Vole

Critical habitat for the Amargosa vole, a small rodent, has been designated (Federal Register Volume 49, No. 222, 1984) and includes approximately 2,440 acres of public land. Located along the Amargosa River between the towns of Shoshone and Tecopa, California, critical habitat primarily encompasses lands in the Grimshaw Lake Natural Area ACEC vicinity and immediately south. Additional suitable riparian habitat for the vole occurs on public and private lands located to the south in the Amargosa Canyon Natural Area ACEC, and to the north as far upstream as the town of Shoshone. The public and private lands between the two existing ACEC form a critical link protecting the species.

North Mojave Desert Bats

The planning area supports at least nine different bat species, eight of which are designated as California BLM sensitive species (Appendix I) of NEMO (2002a). Bats use both natural features, such as rock crevices, rocky outcrops, cliffs, caves, desert washes and riparian and human-created habitat features, such as historic mine-workings, mineshafts, adits and abandoned buildings. The Amargosa River and its tributaries (China Ranch Wash, Salt Creek, and Willow Creek), together with the Kingston Mountain-Silurian Hills-Kingston Wash area, represent a bat concentration zone in the planning area.

The Silurian Hills is a semi-mountainous region located in Silurian Valley. It is bounded on the west by a flat plain, Silurian Dry Lake and Salt Creek. On the east are the Shadow Mountains and a flat plain. On the north, it is bordered by Kingston Wash and Valjean Dunes; and on the south, by the Hollow Hills Wilderness. Public lands in this area total approximately 7,400 acres, with a scattering of private lands located immediately to the south. Mining occurs on some of the private parcels. Numerous cliff faces and crevice slopes are common in the Silurian Hills. Mine shafts and adits are also numerous, and at least four bat species are known to use these shafts and adits as roosting, hibernation or maternity sites. Additional bat species are suspected to use the area as well.

Habitats crucial for a wide variety of desert bat species surround Silurian Hills, i.e., desert washes, springs, desert riparian areas, sand dunes, crevice slopes, wide plains and mountains. The Kingston Wash is thought to be a major bat foraging area and flight corridor into the Kingston Mountains. The Salt Creek Hills and riparian area are both a major bat foraging and roosting area, and are suspected to serve as a crucial flight travel corridor into the Avawatz Mountains, where numerous spring foraging and roosting sites occur. This same corridor is also important for bat species that use the Ibex Dunes and Dumont Dunes.

Inyo Mountains Slender Salamander

Amphibians are rare in the desert as they depend on pools and streams for reproduction. The Inyo Mountains slender salamander (*Batrachoseps campii*) is an uncommon species known only from several canyons on the west and east slopes of the Inyo Mountains. They are associated with permanent springs or seepage, primarily below the pinyon-juniper belt, where they reside under rocks on moist soil in shaded, steep-walled canyons. Giuliano (1976) found the Inyo Mountains slender salamander in a majority of the canyons on the east slope of the Inyo Mountains, including Hunter and Craig Canyons and Willow Creek.

Inyo California Towhee

The total known distribution of the Inyo California towhee lies in the southern Argus Range at elevations ranging from 2,680 ft. to 5,630 ft. The Inyo California towhee was listed as a state endangered species and a federally threatened species under the Endangered Species Act due to the small population, its restricted range, and the potential destruction of its habitat (LaBerteaux and Garlinger 1998). Potential threats to its habitat include wild burros and horses, mining, recreational activities, cattle grazing, water exportation, and encroachment by rural residents.

Critical habitat (5,802 acres) was designated for the Inyo California towhee in 1987. It includes riparian habitat at springs as well as upland and streambed habitats surrounding the springs. Only a small portion (less than 5%) of the species' critical habitat occurs within the NEMO Routes planning area. The majority of the critical habitat occurs to the south and west, within the West Mojave planning area.

The following discussion of habitat for the Inyo California towhee is taken from the recovery plan for the Inyo California Towhee (U.S. Fish and Wildlife Service 1998a).

Inyo California towhees nest and forage in areas of dense riparian vegetation dominated by willows (*Salix* spp), Fremont cottonwood (*Populus fremontii*), and desert olive (*Forestiera neomexicana*) with associated rubber rabbitbrush (*Chrysothamnus nauseosus*) and squaw waterweed (*Baccharis sergiloides*). They also nest in shrubs of the upland community adjacent to riparian habitat and use the upland habitat as their principal foraging grounds. This habitat consists of Mojave creosote bush (*Larrea tridentata*) scrub or Mojave mixed woody scrub. (LaBerteaux 1994).

LaBerteaux and Garlinger (1998) conducted an Inyo California towhee survey during the 1998-breeding season. A total of 640 adult towhees representing an estimated 317 pairs and 23 single adults were detected at 210 sites within the Argus Range. Prior to the 1998 survey, the towhee population was estimated to be no more than 200 individuals. Along with an increase in the numbers of birds detected, the 1998 census documented a range expansion of 15 km to the north of the previous known range. Seventy-three percent of the population occurred on U.S. Navy lands, 25% on BLM lands on the east slopes of the Argus Range, and 2% on State-owned and private lands.

Least Bell's Vireo

Least Bell's vireo (*Vireo bellii pusillus*) is a state and federally listed endangered species. The vireo was federally listed in 1986 and critical habitat was designated in February 1994. The NEMO Routes planning area does not contain critical habitat for this species. At the time of listing, an estimated population of the least Bell's vireo was only 300 pairs (RECON 1989)

The least Bell's vireo is a small, gray migratory songbird that has declined dramatically in both numbers and distribution. This species was once widespread and abundant throughout the Central Valley and other low elevation riparian zones in California. Least Bell's vireo historically bred in riparian woodlands from the interior of northern California (near Red Bluff, Tehama County) to northwestern Baja California, Mexico. In 1973, no least Bell's vireos were found during an extensive search of their formerly occupied habitat between Tehama County and San Joaquin County (Gaines 1974). By 1980 the species was extirpated from the entire Central Valley (U.S. Fish and Wildlife Service 1998b). Its current breeding distribution is restricted to a few localities in southern California and northwestern Baja California, Mexico (Franzreb 1989). There are breeding records for the southern Owens Valley of Inyo County and it regularly breeds at the South Fork of the Kern River Preserve (Heindel pers. comm.).

Least Bell's vireo nests primarily in willows (*Salix* spp.), but also uses a variety of other shrub and tree species for nest placement. Foraging occurs in riparian and adjoining upland habitats. Quality habitat occurs within the NEMO Routes planning area, along the Amargosa River in San Bernardino County. The reduction of least Bell's vireo numbers and distribution is associated with widespread loss of riparian habitats and brood parasitism by the brown-headed cowbird (*Molothrus ater*). Habitat degradation characterized by changes in predator-prey relationships, livestock grazing, agricultural use, dam construction, fragmentation, isolation, pollution, and human disturbance is associated with habitat loss (Kus 1998). About 76 percent of the U.S. population is found at just five localities (USFWS 1994b Federal Register 59:4848-4867).

Since federal listing in 1986, and follow-up restoration and management activities, the species has undergone a population increase almost as dramatic as its decline. The 1996 breeding population of the

least Bell's vireo in California consists of 1,346 pairs (USFWS 1998b). . In addition to population increases, observations indicate that the species is undergoing a northward expansion (Craig and Williams 1998). Currently, least Bell's vireos are re-colonizing areas unoccupied for decades and have the potential to reestablish breeding populations in the central and northern portions of their historical range (USFWS 1998b).

Southwestern Willow Flycatcher

The southwestern willow flycatcher (*Empidonax traillii extimus*) is a federally endangered species. The final ruling listing the southwestern flycatcher as endangered was published in February 1995, although designation of critical habitat was postponed (USFWS 1995). It is currently known to breed at only about 75 sites in riparian areas throughout the southwest. The known breeding population is estimated at between 300 and 500 pairs. The southwestern willow flycatcher nests only in dense riparian vegetation associated with streams, rivers, lakes, springs, and other watercourses and wetlands.

The most significant historical factor in the decline of the southwestern willow flycatcher is the extensive loss, fragmentation, and modification of riparian breeding habitat. Large-scale losses of wetlands have occurred, particularly the cottonwood-willow riparian habitat. (Phillips et al. 1964, Johnson and Haight 1984, Katibah 1984, Johnson et al. 1987, Unitt 1987, General Accounting Office 1988, Dahl 1990, State of Arizona 1990). Habitat changes have occurred and continue to occur because of urban, recreational, and agricultural development, water diversion and impoundment, streambed alteration, livestock grazing, and replacement of native habitats by introduced plant species. Fire danger in riparian systems may increase with the conversion from native to exotic vegetation, diversions or reductions of surface water and drawdown of local water tables.

Brood parasitism by the brown-headed cowbird is another significant and widespread threat to the southwestern willow flycatcher. Once a flycatcher nest is parasitized, it has almost no chance of producing flycatcher young, which may result only in the rearing of cowbird chicks (National Park Service Technical Report 1997). At the South Fork Kern River Preserve, an average of 63.5% of nests were parasitized from 1989 to 1992, with a range from 50% in 1989 to 80% in 1991 (Craig and Williams 1998). Trapping of brown-headed cowbirds has proven to be successful in decreasing the rate of parasitism and is a valuable tool that can be used as riparian habitat restoration proceeds.

Swainson's Hawk

The Swainson's hawk is a California threatened species. Swainson's hawks were considered to be a common to abundant breeding species in California at the end of the 19th century (Sharp 1902). By the early 1940s, breeding population declines were being documented (Grinnell and Miller 1944). Bloom (1980) conducted the first statewide survey of Swainson's hawks in California in 1979 and estimated 110 nesting pairs and a total population of 375 pairs in California. These data revealed that the remaining population centers were in the Great Basin in the extreme northeastern portion of the state and in the Central Valley, and that the species was nearly extirpated throughout large parts of its former range. The declines were greatest in coastal southern California where Sharp in 1902 had classified the species as abundant. In 1988, the total statewide population was estimated to be 550 breeding pairs. Additional surveys done in the 1990s indicate that the total statewide population is 500-1,000 breeding pairs. The difference in numbers of breeding pairs between 1980 and the 1990s is thought to be the result of increased survey efforts and not a population increase.

The decline of Swainson's hawks in California has been attributed to mortality during migration and on the wintering grounds in South America, poisoning by toxic chemicals, including pesticides in South America, eggshell thinning, habitat loss on wintering grounds, disturbance on breeding grounds, loss or degradation of habitat on the breeding grounds, and increased competition with other species. Habitat degradation could occur through a variety of mechanisms including but not limited to fires, which eliminate nesting opportunities in Joshua trees and riparian trees. Decreases in prey populations or long-term recruitment of new nest trees, alteration of normal stream and wash hydrology, can lead to the loss of riparian habitat, and lowering of water tables that result in the loss of nesting habitat, or contribute to a decline in prey availability. Shooting, has historically contributed to the loss of birds (England 1998). Bloom (1980) estimated the historical population in the Mojave and Colorado Deserts at 270-1,080 pairs. Declines of the hawk in the Mojave Desert, according to Bloom, could be directly related to the decrease in the range of the Joshua tree. As the tree's range decreased, especially in the Antelope Valley, Swainson's hawk numbers probably decreased proportionately.

Historically, the Swainson's hawk breeding range in California included the Great Basin and Modoc Plateau, the Sacramento and San Joaquin Valleys, the coastline in Marin, Monterey, Ventura, Los Angeles, and San Diego counties, and a few scattered sites in the Colorado and Mojave deserts (Bloom 1980). Swainson's hawks nest almost exclusively in trees, but in a few instances have been recorded nesting on cliffs, coulees, human-built structures, and the ground. But these types of sites are rarely used (England et al. 1997). A survey of nesting birds in 1979 revealed that Swainson's hawks nested almost exclusively in large, sparsely vegetated flatlands characterized by valleys, plateaus, broad floodplains, and large expanses of desert.

Typical habitat for the Swainson's hawk is open desert, grassland, or cropland containing scattered, large trees or small groves where they prey upon a variety of animals including bats, birds, lizards, snakes, amphibians, and insects. The prey species vary from location to location, but are generally dominated by ground squirrels, jackrabbits, cottontails, mice, gophers, and birds such as mourning doves during the breeding season. Insects are an important part of the diet outside of the breeding season.

Western Yellow-billed Cuckoo

The yellow-billed cuckoo (*Coccyzus americanus occidentalis*) is a California endangered species. A statewide survey of yellow-billed cuckoos in California during 1986 and 1987 found a total of 30-33 pairs and 31 unmated males at nine localities (Laymon and Halterman 1989). More recent surveys on the Sacramento River from 1988-1990 have shown a fluctuating population of 23-35 pairs depending on the year (Halterman 1991). Continuous surveys on the South Fork of the Kern River from 1985-1996 have shown a population that varied from a low of 2 pairs in 1990 to a high of 24 pairs in 1992 (Laymon et al. 1997). These two sites are the only localities in California that sustain breeding populations. Small and unstable breeding populations are found along the Amargosa River near Tecopa and at several locations in the Owens Valley.

Yellow-billed cuckoos have one of the most restrictive suites of macro-habitat requirements of any bird species. They inhabit extensive deciduous riparian thickets or forests with dense, low-level or understory foliage, and which abut on slow-moving watercourses, backwaters, or seeps. Willow is almost always a dominant component of the vegetation. They may inhabit mesquite thickets when willow is absent. Nesting typically occurs in sites with at least some willow, dense low-level or understory foliage, high humidity, and wooded foraging spaces in excess of 300 feet in width and 25 acres in area. Nesting sites with less than 40% canopy closure are unsuitable. Those areas with greater than 65% closure are optimal (Laymon 1998). In California, during the breeding season the cuckoos remain in cottonwood-willow

riparian habitats (Laymon 1998). Cuckoos have large home ranges, often exceeding 50 acres and sometimes approaching 100 acres (Laymon and Halterman 1985).

The cause of decline of yellow-billed cuckoos both historically and recently is primarily from habitat loss on the breeding grounds in California. Habitat loss has occurred due to clearing for agriculture, clearing for flood control, flooding behind dams, withdrawal of ground water causing a lowering of the water table, clearing for urban and suburban development, invasion by exotic vegetation, and long-term (greater than 100 years) and intensive year-round grazing (Laymon 1998). Firewood cutting and wildfire cause important temporary losses of riparian habitat.

3.2.4 Cultural Resources

Ethnographic studies of tribal distributions were completed for all of the CDCA as part of CDCA Plan. The NEMO Routes cultural analysis tiers from the CDCA Plan studies. At European contact, circa 1776, with the crossing of the Mojave Desert by the Spanish Franciscan priest Francisco Garces, various Yuman and Shoshonean peoples whose cultures were characterized by complex adaptations to the arid environment inhabited the area. These include the Serrano Indians, who occupied the Mojave River Valley and San Bernardino Mountains during the Late Prehistoric until the Historic Era. The Mohave natives occupied the Colorado River Valley and portions of the Mojave Desert adjacent to the river, Western Shoshone (Panamint/Koso and Timbisha Band). Kawaiisu and Southern Piute peoples inhabited portions of the Colorado River Valley, lands adjacent to Death Valley, Fort Irwin, and the Chemehuevi lived in the Mojave Desert from the Colorado River to lands within the Mojave Preserve. All of the desert-adapted groups practiced hunting and gathering subsistence strategies, making the seasonal round, exploiting available plants, grass seed resources, acorns, and available mammals. They interacted with their neighbors and some type of trade existed, evidenced by marine shell beads and obsidian utilized for tools. In addition, the Mohave practiced limited agriculture in the flood plains of the Colorado River.

Cultural resources are generally concentrated along trails around springs and along lake margins. In addition, Native American sites are found adjacent to seasonal collection or mining areas for tools. Some of these are the same areas that current day rock-hounds use. Cultural properties include a variety of prehistoric camps and trails as well as historic mining, military, and transportation activities. Also, the Dinosaur Trackway Site is California's only known occurrence of fossil Mesozoic reptile tracks. It has been impacted by a historic rock quarry and partially transected by an old mining road.

Numerous sites within the boundaries of the planning area have been listed on or determined eligible for inclusion on the National Register of Historic Places (NRHP). In addition, several sites are listed as California Historic Landmarks (CHL) and California Points of Historic Interest (CPHI). (See Table 3-1 which follows.) Sites listed on the CHL and CPHI may or may not have been evaluated for NRHP. Several were identified as historic landmarks as a consequence of eligibility evaluations. Due to their potential to yield information important to prehistory and history, several archaeological sites have been determined eligible for inclusion on the National Register of Historic Places. The locations of these sites are confidential. Old Traction Road and 20-Mule Team Road also cross the planning area and are potentially eligible for inclusion on the NRHP. Both sites were identified as sites of concern during NEMO public scoping.

In addition to Table 3-1, eligible properties include Picture Canyon, Halloran Springs, Coyote Holes, intaglios and campsites within the Crucero ACEC, Horsethief Springs, Camp Essex Division Camp, Camp Clipper, Army Air Force airfields and U.S. Army Quartermaster facilities within the CAMA-AMA,

historic resources associated with the Clark Mountain Mining District, numerous prehistoric and historic trails, and immigrant and mining roads.

Table 3-1. Identified Significant Cultural and Native American Resource Sites

Property Name	Listed	Eligible	CHL	CPHI	Notes
CA-SBR-3186 (Baker vicinity)	X				aka Aboriginal Rock Cairn Site
Paiute Pass Archaeological District	X				Mojave Preserve
Cerro Gordo National Historic District	X				
Death Valley Junction Historic District	X				Private land
National Old Trails Road (CA-SBr-2910H)		X			aka Route 66
Mormon Road/Trail (CA-SBr-4411H)		X			
AT & SF Railroad (CA-SBr-6693)		X			
Old Spanish Trail (CA-SBr-4272H)		X			
Tonapah & Tidewater Railroad (CA-INY-4772H)		X			aka CA-SBr-2340H
Hoover Dam to San Bernardino Transmission Line		X			CA-PSBr-38H
Boulder Transmission Lines 1, 2, 3		X			CA-SBr-7694H
Mormon Road Monument (CA-SBr-4411H)			X		
Harry Wade Exit route			X		
Searles Lake Borax Discovery Site			X		
National Old Trails Monument			X		
Von Schmidt State Boundary			X		
Mojave Road (CA-SBr-3033H)			X		
California/Arizona Desert Training Center Maneuver Area			X		
Camp Ibis (Desert Training Center)			X		Patton Camps
Lanfair				X	

Properties determined ineligible include many small and large prehistoric lithic scatters and other prehistoric structures containing remains without diagnostic characteristics or sufficient site integrity that could contribute to the knowledge of the history and prehistory of the Mojave Desert. Unevaluated properties include lithic scatters, prehistoric rock alignments, and historic trash scatters that have not been determined eligible or ineligible. The vast majority of the routes of transportation within the NEMO Routes planning area have not been surveyed for cultural properties. The majority of the recorded archaeological sites, 355 of the 464 properties (77%), have not been evaluated for eligibility for nomination to the National Register of Historic Places, as identified in Table 3-2.

Table 3-2. Eligible, Ineligible and Un-determined Eligibility of Archaeological and Historic Sites

Site Status	Moderate-High Use			Low-Moderate Use		Total
	High Use	Moderate-High Use	Moderate Use	Moderate Use	Low Use	
Eligible	15	11	9	14	2	51
Ineligible	27	14	12	2	3	58
Undetermined	28	4	35	0	4	355
Total	70	29	56	16	9	464

Table 3-2 shows a general trend with most sites being documented in Moderate-High and High Use areas and fewer sites documented in the Moderate and Low Use areas. This consistent pattern is explained by a documentation bias rather than the lack of sites in areas of low and moderate use. The majority of determinations of eligibility for nomination to the National Register of Historic Places resulted from archaeological surveys and investigations resulting from construction projects associated with utility transmission projects (i.e. pipeline, communication cable, electrical transmission lines, and utility upgrade projects) and in High and Moderate to High Use Special Areas, i.e. not in low use areas which are infrequently surveyed.

3.2.5 Soils

The soils in the planning area are as varied as the landforms, microclimates and geology of the region. Soil surveys have been conducted in the Saline Valley area and the Kingston-Amargosa areas, but most of the soils have not been formally surveyed. Most planning area soils are poorly developed, and are generally well drained and coarse textured. Some portions of the planning area are internally drained, resulting in small playas with surface clays, surface physical soil crusts and increased salinity. The soil depth ranges from deeper alluvial materials to very shallow or non-existent depth over the rocky substrate. The soils are susceptible to accelerated erosion from wind and water, especially when the surface has been disturbed. Portions of the soils have been subject to periodic disturbances due to grazing, mining, agriculture, OHV activity and other resource uses.

The California Desert Conservation Area Plan (USBLM 1980) classified the desert soils based sensitivity to surface disturbance. The three classes of Low, Medium, and High were based on surface texture, slope, rock topography and other factors, which affect soil sensitivity to surface disturbance. The CDCA Plan classified a majority of the soils in the northwest portion of the planning area in the high sensitivity class with most of the remaining soils in the medium sensitivity class. Soils in the eastern and southeastern portions of the NEMO Routes planning area are nearly evenly split between a high and medium classification. There are small sections of low sensitivity soils spread through the entire area.

3.2.6 Water

Groundwater and surface water sources occur throughout the NEMO Routes planning area. A large number of surface water sources exist within the northwestern portion of the planning area, where most mountain ranges reach over 10,000 feet elevation and include numerous streams, springs, seeps, and a lake. Perennial streams exist in Middle Park, Pleasant, Happy, Surprise, Hall and Jail Canyons in the Panamint Mountains, Water, Knight, Revenue, Snow and Thompson Canyons in the Argus Range, Daisy, Craig, Hunter, Beverage, Keynot, McElvoy, Pat Keys and Willow Creek Canyons in the Inyo Mountains and Weyman, Cottonwood, Toler, McAfee and Perry Akin Canyons in the White Mountains. Weyman, Cottonwood, McAfee and Perry Akin creeks all support trout fisheries and are diverted near their mouth for irrigation. Several large springs occur on private land in Deep Springs Valley. Corral Spring has a very large flow and is one of the major sources of water for Deep Springs Lake, which covers nearly 2,000 acres. The associated private wetland includes habitat for the state endangered black toad (*Bufo exsul*). The eastern and southeastern portions of the NEMO Routes planning area have a number of significant water sources including the Amargosa River, Willow Creek, Grimshaw Lake, Salt Creek and Tecopa Hot Springs.

The Amargosa River is the focal hydrological system of the northern and eastern Mojave Desert (NEMO) planning area. The hydrologic systems of the southern Great Basin and northern Mojave Desert are

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generally characterized by deep water tables. They are also considered primarily closed groundwater basins. One of only two large rivers in the Mojave Desert, the free-flowing Amargosa River, includes perennial and ephemeral surface flows as well as subterranean flows.

Water runoff from the Bullfrog Hills, Yucca Mountain, Shoshone and Spring Mountains in Nevada, all contribute to Amargosa River water flow in California. Major river tributaries include the aforementioned Lower Carson Slough in the northern reach of the river, China Ranch Wash in the central reach, and Salt Creek in the south. Approximately 94% of the lands along the river in California are in Federal ownership. Portions of this river were determined eligible for the National Wild and Scenic Rivers System (see Appendix O of the NEMO Proposed Plan/FEIS, July 2002).

Groundwater occurs in nearly all of the valley basins in the planning area, varying greatly in depth, quantity and quality. A portion of the water comes from current recharge from the surrounding mountains and old water deposited during the fluvial lake period 10,000 years ago. For many of the basins, the current recharge rate is low. Groundwater withdrawals from these basins can result in large drawdown. Portions of the Amargosa Valley are underlain by a regional carbonate rock aquifer. This aquifer transports large volumes of water under mountain ranges in the area and collects water from many widespread watersheds. Major springs occur along this carbonate aquifer system including Ash Meadows Springs, which annually discharges 17,000 acre-feet of water, and the Furnace Creek springs which produce 5 cubic feet per second (3,500 acre-feet per year). Discharges from this carbonate rock aquifer are the source of water for Devils Hole and the Lower Carson Slough. Water withdrawals from the Amargosa watershed in the Death Valley Junction area could impact the flows at Ash Meadows and Furnace Creek. Currently, commercial ground water pumping is occurring in Fish Lake Valley, Ash Meadows, Pahrump Valley and Ivanpah Valley.

3.2.7 Watersheds

The unified watershed assessment conducted in preparation of the Clean Water Action Plan (1998) classified the watersheds into one of four categories. They are:

- Category I- Watersheds that are candidates for increased restoration activities due to impaired water quality.
- Category II- Watersheds with good water quality that, through regular program activities can be sustained and improved.
- Category III- Watersheds with pristine or sensitive areas on federal, state or tribal lands that need protection, and
- Category IV- Watersheds where more information is needed.

Table 3-3 displays the watersheds as classified within the NEMO Routes planning area.

Table 3-3. Watershed Categories

Category I Watersheds (Impaired)	Category III Watersheds
Eureka-Saline Valleys Upper Amargosa ^a Upper Mojave	Fish Lake – Soda Springs Valleys Ivanpah – Pahrump Valleys Death Valley – Central and Lower Amargosa Panamint Valley

^a This impaired classification may be due to high salinity that is a natural phenomenon. According to the California Regional Water Quality Control Board, Lahontan Region, South Lake Tahoe, California and USEPA Region 9 (2000), in the Amendments

to the Lahontan Water Quality Control Basin Plan, the Amargosa River is a naturally impaired water body in terms of drinking water quality, and has been removed from beneficial use designation.

3.3 Uses

Uses in the planning area are discussed in this section in alphabetical order.

3.3.1 Lands and Realty

Lands are acquired, disposed of, or exchanged in accordance with the Federal Lands Policy and Management Act of 1976 (FLPMA) and other applicable Federal laws and regulations, to assure more efficient management of the public lands, reduce conflicts with other public and private landowners, and facilitate consistency and logic in desert-wide land-use patterns. The existing and proposed land tenure strategy for the planning area is discussed in more detail in Appendix N of the NEMO Proposed Plan (July 2002).

In areas where public and private lands are intermingled, private property owners need access through public lands. However, the casual public may not have the opportunity to cross these same private lands to access public lands. Public easements do not generally exist for routes that cross most private lands, except in many cases where the route serves as right-of-way or easement for a commercial use (e.g., pipeline or transmission line maintenance). The County may make an R.S.2477 assertion to establish the public's right of passage on a route if certain criteria are met.

3.3.2 Livestock Grazing

There are 13 cattle allotments (a designated area suitable for grazing) within the NEMO Routes planning area. Eight allotments are in the Ridgecrest Resource Area, four are in the Needles Resource Area, and one is in the Barstow Resource Area.

Grazing use of perennial vegetation in all allotments is expected to continue for the reasonably foreseeable future. Typically, grazing leases are authorized by the BLM in the planning area for 10 years. A shorter period of time is sometimes issued for special circumstances, such as to accommodate a shorter-term lease of the base property or when the Authorized Officer determines that a shorter term is in the best interest of range management. Additionally, non-renewable grazing authorizations may be issued for special short-term needs such as trailing, or when there is short-term surplus forage available. In the last ten years, lessees have not requested, nor has grazing been authorized for ephemeral forage or temporary non-renewable perennial forage. All leases are subject to modifications and to annual adjustments. These are implemented through consultation between the lessee and the BLM.

The eastern Mojave Desert has been in drought conditions for much of the 1990s and forage conditions have been poor in many places. As a result livestock producers have voluntarily reduced stocking rates and consumption of perennial forage has been lower than the leases allow. Implementations of these grazing leases may require lessees to have collection areas to facilitate the handling of livestock. (e.g., corrals and feed supplements). Other range developments are primarily used to enhance or impede cattle movement or improve the condition of forage (e.g., wells, pipelines, troughs, prescribed fires, fences, spring developments, and reservoirs). Access is needed to various portions of allotments and improvements for management purposes. Few range improvements have been installed in the last ten years. Installation of new improvements would be based on a case-by-case analysis and available funding. Periodic and annual maintenance is required on existing facilities. Maintenance requires the

lessee to visit improvements. There are many range improvements found in wilderness. Ongoing maintenance of existing improvements coupled with minimal additions of new infrastructure, has marginally increased demands for maintenance.

The grazing lease for each allotment identifies the number, kind and/or type of livestock that may graze the allotment and the grazing period, usually with specific beginning and ending dates. Many leases also require adherence to grazing prescriptions in the form of systems such as deferred, deferred-rotation, or rest-rotation. Other authorizations may have conditions pertaining to turnout dates based on vegetation conditions.

Some leases have specific grazing utilization standards and other conditions to protect sites, such as riparian areas, wildlife habitat, special status plant populations, etc. Usually these conditions have been developed in consultation and cooperation between BLM and the livestock operator in the form of an allotment management plan. On allotments where riparian areas exist, the riparian areas, whether lentic or lotic, constitute a very small proportion of the allotment area and are often located in a fragmented pattern throughout each allotment. Although these areas constitute a small amount of the overall forage available for livestock, they are attractive to the animals, because of their proximity to water, shade, and vegetation that remains succulent much longer than adjacent upland vegetation. Consequently, livestock tend to congregate in these areas and can quickly overuse the riparian vegetation. The use of riparian-wetland areas by other ungulates, in conjunction with livestock, makes the problems complex. Wild horses and burros, in particular, present a difficult management problem. These animals also find most riparian-wetland areas attractive and may overuse the vegetation even in the absence of livestock.

Currently, grazing activities within the planning area utilize the fallback standards and guidelines. Assessments for most allotments in the planning area were completed in 1999. A summary of the sixteen allotments, including the results of the most recent assessments, is provided in Table 3-4. Most of the allotments do not have Allotment Management Plans (AMP). Most of the AMP are south of the planning area, where critical desert tortoise habitat exists and routes have been previously designated (NEMO 2002b). Refer to Appendix P of the NEMO Proposed Plan and FEIS (July, 2002) for additional resource related information.

Table 3-4. Grazing Allotment Resource Information for the NEMO Routes Planning Area

Allotment Name	Forage Type ^a	Acres	AUM	MIC ^b	1999 assessment ^c	Standards ^d
Clark Mountain	Per/Eph	97,560	1,303	M	Yes	2
Crescent Peak	Per/Eph	6,719	359	C	Yes	2
Deep Springs	Perennial	43,932	1,250	M	Yes	2 (3)
Eureka Valley	Ephemeral	17,000	0	UC	No	2 (3)
Fish Lake Valley	Perennial	577	52	UC	No	2 (3)
Horsethief Springs	Per/Eph	150,140	2,424	M	No	2
Hunter Mountain	Perennial	53,920	0	I	Yes	2
Last Chance	Perennial	35,532	1,639	I	Yes	1
Oasis Ranch	Perennial	22,968	656	I	Yes	2
Pahrump Valley	Per/Eph	26,952	353	M	No	2
South Oasis	Perennial	15,173	477	I	Yes	4
Valley View	Per/Eph	31,575	849	C	Yes	2
White Wolf	Perennial	13,733	307	M	No	2 (3)

^a Ephemeral and/or perennial are the two forage types that may be grazed on an allotment. Ephemeral forage primarily consists of ephemeral grasses and forbs. Perennial forage primarily consists of perennial grasses and shrubs.

^b There are four Selective Management Categories (M, I, C, UC) for grazing allotments. Category M allotments are in satisfactory resource condition and are producing near their potential under existing management strategies. There are little or no known resource use conflicts or controversies. Category I allotments generally have potential for increasing resource production or conditions, but are not producing at that potential. There could be conflicts or controversy involving resource conditions and uses, but there are realistic opportunities to enhance resource conditions. Category C allotments usually consist of relatively small acreage or parcels of public land. They are often, but not always, intermingled with larger amounts of non-federally owned lands. There are little or no known resource use conflicts or controversies. Usually opportunities for positive economic return from public investments are limited in these allotments. Category UC allotments are not yet classified.

^c This column indicates if a rangeland health assessment was completed in 1999. Prior to determining achievement of standards, a field assessment of resource conditions is to be conducted by a team of field specialists.

^d The Standards column indicates the category based on results from the health assessment or an estimation of resource conditions if the assessment is not completed. The categories are; (1) areas where one or more standards are not being met, (2) areas where all standards are being met, (3) areas where the status of one or more standards is not known, and (4) areas where one or more standards are not being met, but factors other than cattle grazing is the primary contributor to the problem.

3.3.3 Minerals and Mining

The Southern California region, including much of the Mojave Desert, is one of the most highly mineralized areas in the United States. This is due to the variety of geologic terrain exposed in the many mountain ranges and the depositional environments of the intervening basins. A discussion of the geology-energy-minerals data base and preliminary analysis of economic geology, mineral commodities and related socio-economics of the CDCA is contained in Appendix G of the 1980 CDCA Plan. Guidelines for mineral exploration and development may be found on pages 89 to 91 of the 1980 CDCA Plan as amended. Maps 12 and 14 of the CDCA plan show potentials for locatable and saleable minerals, respectively for the CDCA.

The NEMO Routes planning area is situated along the northeastern margin of this mineralized region, and contains many known mineral deposits and potential for the discovery of additional mineral resources as shown in the NEMO Proposed Plan, Chapter 8, Figure 3a (July, 2002). Mineral development is encouraged on public lands outside of specially designated areas and managed under several laws by

three categories: locatable, leaseable, and saleable. Mineral commodities mined currently or in the recent past include gold, silver, barite, boron, hectorite, bentonite, gypsum, tungsten, talc, zeolites, sodium, limestone, sand and gravel, stone, turquoise, and rare earth elements (e.g., cerium, praseodymium, europium, and yttrium). Gold production occurs at two major mines located in the northern portion of the planning area at the Briggs Mine in the Panamint Range and the Castle Mountain Mine in the Castle Mountains. Gold prospecting has occurred throughout the planning area. Inactive small mines and prospects are scattered throughout the planning area. See the NEMO Proposed Plan, Chapter 8, Figure 3b (July, 2002).

Southern Clay Products Company has applied for a mineral patent on about 225 acres in Section 31, T.27 N., R.5 E, and Section 6, T.26 N., R.5 E. in the Upper Amargosa portion of the planning area. Hectorite clay at this site has been mined since 1974 and occurs southwest of the Amargosa River drainage. In Section 31, the patent application block comes within 700 feet of the Amargosa River and in Section 6 it comes within 1,300 feet. Southern Clay Products has two open pit mines for hectorite clay within the area and is currently mining at a rate of about 5,000 tons per year. The Upper Amargosa portion of the ACEC also contains the access road to the Sidehill Mine.

Talc is mined from a few deposits located in the Inyo Mountains and Kingston Range. Limestone is quarried in the Argus Range and new production can be expected from the southeastern Bristol Mountains and elsewhere. Active gypsum mining has been reported on Mesquite Lake and the surrounding area. Many small-scale intermittent mines exist throughout the planning area for various mineral commodities.

There are no active mines within ACEC, although the access route to a zeolite mine southeast of Death Valley Junction passes through critical habitat for the endangered Amargosa niterwort.

Sand and gravel and other aggregates are produced within the planning area. Although they occur throughout the planning area in alluvial fans and other sedimentary deposits, commercial deposits are limited by transportation costs and therefore are usually located near market areas. These commodities are used primarily for major highway construction and repair, and as aggregate for concrete in urban areas. The Inyo County Transportation Department produces between 500 and 600 tons per year of sand and gravel from a borrow pit within the west boundary of the study area and just northeast of Furnace Creek Road in NW1/4 Section 29, T.21 N., R. 7 E.

Access and water resources are important aspects associated with mineral development, and will be an important consideration for future development.

Minor geothermal resources exist in the Tecopa area. In 1967 an exploratory water well was drilled north of Tecopa. Strong artesian flow occurs from this well near the boundary of the Amargosa River ACEC in SW1/4 Section 28, T.21 N., R.7 E. and just north of Tecopa's hot springs. The water continues to rise to the surface and flow into the marsh. In 1970 the temperature was 100 degrees at the surface and flowing at 150 to 200 gallons per minute. Based on the size and scope of the deposits, further development of geothermal resources beyond the current build out conditions is not anticipated within the planning area. Although oil and gas potential has been identified in some areas, further exploration is not foreseen. There are no current leases for sodium resources.

Future production is expected to be concentrated in the categories of gold (especially if there is a price increase), aggregate, particularly along I-15, and nonmetallic minerals including specialty clays and limestone. Only minor activity is anticipated in lead-zinc-silver deposits so long as commodity prices remain depressed. Mines in the Silurian Hills have produced lead, copper, silver, gold, and talc. In the

Riggs District, the patented Riggs mine, within 1,500 feet of the southern boundary of the area, produced 200,000 ounces of silver up to 1920 and has been idle since then, except for recent drilling. Assays at another claim group in the southeast part of the Silurian Hills identified silver values to 2.85 ounces per ton and copper to 36 pounds per ton. Additional mining claims, located ½ mile south of the area, have been actively worked for silver and lead for many years.

Idle talc mines known collectively as the Patricia-Blue White-Ceramic zone occur in the southeast corner of the Silurian Hills. The Ceramic mine produced up to 1,000 tons from 1940 to 1942. Workings consist of shallow exploratory excavations, several adits, and a 40-foot inclined shaft and several cuts. The patented Silver Lake talc deposits, 3 miles to the south of the area, produced over 160,000 tons from 1915 through the 1950s.

The potential for future development is difficult to assess. Unless commodity prices increase, production of metallic minerals such as lead, silver, and gold would probably be limited to small, two-man operations in underground workings such as adits. Talc production is anticipated to be low based on the lack of production within the area over 50 years, the small volume of past production, and the fact that no plans of operation have been received.

The area has moderate potential for the occurrence of saline, sodium borate deposits based on past production of borax from a spring from 1882 to 1890. The potential for production of borates in this area within the next 25 years is probably low, based on a lack of production over the last 100 years.

3.3.4 Recreation

With expanded leisure time and growing affluence among the general population, the California Desert attracts millions of visitors annually. The desert provides the resources necessary for a variety of recreation. These resources provide natural beauty, solitude, and freedom from the structure and regulations of urban areas. In all recreational opportunities, scenic values are often cited as an important resource to the participants' recreation experience. Virtually all recreation activities are dependent upon availability of access within the planning area. Most visitors travel on previously used or marked motorized vehicle routes. Recreation opportunities are grouped along a continuum of opportunities ranging from intensive vehicle-oriented to resource-oriented activities, although there is often overlap between the two.

In most cases, public recreation use of BLM-administered lands is unsupervised and unorganized. BLM management of recreation activities, facilities and visitor contacts center around activities and services for recreationists that visit the Dumont Dunes OHV area, participate in OHV organized events or other permitted commercial and organized activities (bighorn sheep hunts, other trail rides, vision quests), as well as specific local wildlife conservation sites. Much of the casual use network has not received focused attention or signage unless a problem arises (e.g., washed out route, identification of a resource conflict, etc.), except for primary routes in the network that are located off of major highways.

Nature Study

Wilderness areas and ACEC provide good opportunities to study plants and wildlife including rare or endangered species. Wilderness areas allow nature study in areas protected to maintain their pristine, natural environments. While wilderness areas and ACEC have received special designation to protect their resources, extensive opportunities for nature study are found outside of these areas throughout the planning area.

Hiking Trails

Most hiking trails that lead to historical places are remnant vehicle ways that are grown over with vegetation, wash-out, or no longer open for vehicular travel. Along some of these trails, petroglyphs, archeological sites, and many old mining towns still remain fairly pristine. These remnant trails and canyon washes provide the opportunity for hikers to explore on foot.

Table 3-5. Historic Hiking Trails in the NEMO Routes Planning Area

Name/Field Office	Miles	Resource Values
Burgess Mine Trail - Ridgecrest	7	Historic mining district and Frenchy's cabin
Lonesome Miner Trail - Ridgecrest	4	Heart of historic trail system, Frenchy's cabin, and a mill site
Snowflake Mine Trail - Ridgecrest	7	Best-known and most used trails in the Inyo Mountains, and historical features.
Amargosa Natural Area Trail-Barstow	7	Old Spanish Trail, T&T Railroad, historic mining workings and buildings

Camping and Overnight Accommodations

Most of the camping has traditionally occurred in undeveloped, primitive campsites. In the NEMO Routes planning area there is one RV/trailer campground on public lands that is under lease to Inyo County from the Bureau of Land Management in Tecopa. Tecopa is one of a few towns in the northern half of the planning area, and has a small permanent population and a larger seasonal population during the winter months as a result of this campground. Located immediately north of Tecopa are hot springs that support other resorts and small campgrounds in addition to the BLM site. The larger town of Shoshone is located north of Tecopa. Shoshone is located at the junction of State Highways 127 and 178. Its tourist attractions include its own hot springs located within the town and its location as the eastern gateway to Death Valley National Park. One small bed and breakfast also is located in the NEMO Routes planning area in a remote location, near Tecopa at China Ranch. Many visitors also camp at Dumont Dunes OHV Area. Camping in the planning area mainly occurs in the open desert, within 300 feet of designated routes since there are few designated campgrounds. Public land facilities are not generally available, with the exception of toilets at popular destination locations. Camping is generally associated with other recreation, such as OHV activity, vehicle touring, nature study, rock hounding, and hunting. Wilderness camping may occur anywhere one can walk or access by horseback, except in a few areas that have been closed to overnight use, including the Central Amargosa Canyon.

Both the Amargosa Canyon and Grimshaw Lake Natural Area ACEC are popular hiking and nature appreciation areas, as is China Ranch Wash. China Ranch is a popular tourist attraction at the west end of the canyon, surrounded by the Amargosa ACEC, and includes a date farm and trailed, riparian area. Both ACEC have been designated as national Watchable Wildlife Sites and are listed on numerous maps as

well as in several guidebooks. No active livestock or mining operations occur within these areas. Motor vehicles are prohibited within these natural areas, with the exception of parking areas located at major trailheads. Fire activity is fairly low, and resource advisors address fire suppression activities.

Lakebed Activities

The major dry lakebeds in the CDCA, including in the Northern and Eastern Mojave planning area, have been classified in the CDCA Plan as Open, Closed, or Open with special limitation (Permit Only, use of specified routes only) to motor vehicles. Dry lakebeds that are not specifically classified in the CDCA Plan are available based on the access classification of the area within which they are found. Dry lakebeds provide the basic requirements of open space and smooth surfaces needed for land sailing, model rocket and airplane flying, hang gliding, and stargazing (particularly during celestial events such as the passing of comets). In addition to recreation activities occurring on lakebeds, applications for filming and research are processed annually. Three lakebeds have been classified in the CDCA Plan within the NEMO Routes planning area. Silurian Dry Lake is Open. Vehicle access for Silver Dry Lake is limited within the Wilderness Study Area (WSA) to Approved Routes, whereas outside the WSA vehicle access is limited to Approved Routes or by permit, and in both cases the lakebed itself is Closed. Vehicle access for Mesquite Lakebed and two other lakebeds are classified based on surrounding multiple use class (MUC), and the lakebeds are closed.

Broadwell Dry Lake is located north of Interstate 40 and the town of Ludlow. Use is generally casual in nature due to the uneven surface of the lakebed. Silurian Dry Lake is located on Highway 127 less than 10 miles north of Baker on the east side of the highway. Due to its fairly small size, its primary use is permitted activities such as filming. The management objectives for each dry lake dictate the area's use and special monitoring requirements needed to protect their resource values. Table 3-6 represents the significant dry lakebeds in the NEMO Routes planning area and their recreational availability.

Table 3-6. Vehicle Access on Dry Lakes in the NEMO Routes Planning Area

Dry Lakes	Access
Broadwell Dry Lake	Approved Routes or by permit
Mesquite Dry Lake	Approved routes or by permit
Salt Dry Lake	Approved routes or by permit
Silurian Dry Lake	Open
Silver Dry Lake	Closed within WSA except Approved routes. Outside of WSA, Approved Routes or by permit.

Rock Hounding

Rock hounds from southern California and Nevada heavily use the California Desert. Much of the collecting occurs on BLM lands, with the remainder occurring largely on privately owned land, where it is subject to landowner permission. Collecting is prohibited in the National Parks and National Preserves and on most State Park lands, and on "developed recreation sites and areas," or where otherwise prohibited or posted.

Few direct conflicts between rock hounding and other land uses appear to exist. Most rock hounds prefer areas that are accessible by vehicle on the existing network of roads and trails. Table 3-7 lists the areas where minerals and rocks historically have been collected in the planning area. It does not include wilderness areas that are no longer available by vehicle.

Table 3-7. Rock Hounding Sites in the NEMO Routes Planning Area

Area	Field Office	Site	Materials	Location
Eureka Valley	Ridgecrest	Deep Springs Crystal Area (Crystal Hill) Sulphur Mine Eureka Valley	Smoky Quartz Crystals Variscite Obsidian	T7S, R36E, Sec. 9 (MDM)
Darwin	Ridgecrest	Cerro Gordo Mines Lee Mines	Numerous Minerals Lazulite	T16S, R38E, Sec. 13 (MDM) T17S, R40E, Sec. 23 (MDM)
Panamint	Ridgecrest	Surprise Canyon Panamint City Onyx Mine Ballarat	Lepidolite Idocrase, Diopside, Epidote, Wulfenite “Death Valley Onyx” (Travertine) “Ballarat Marble” (Onyx)	T21S, R45E (MDM) T21S, R45E, Sec. 11 (MDM) T22S, R43E, Sec. 6 (MDM)
Bitter Water	Ridgecrest	Ryan Eagle Peak (Eagle Mountain) Old Ryan (Lila C. Mine) Zabriski Tecopa Pass Eclipse Mine Crystal Spring Mine	Colemantie Agate Jasper Fire Opal Petrified Wood Silver Quartz	T25N, R3E, Sec. 8 (SBM) T24N, R5E, Sec. 24 (SBM) T24N, R4E, Sec. 12 (SBM) T21N, R7E, Sec. 18 (SBM) T20N, R6E, Sec. 18 (SBM) T20N, R9E, Sec. 25 (SBM)
Owlshead/ Amargosa	Barstow	Sperry Wash N. of Denning Springs	Palm Fiber, Root and Limb Sects.	
Kingston	Barstow/ Needles	Kingston Range (Horsethief Springs) Shadow Mountain Toltec Mines (Turquoise Mountain) Mohawk Mine Halloran Spring	Amethyst Azurite Turquoise Cerussite, Galena, Sphalerite, Smithsonite Azurite	T19N, R10E, Sec. 3 (SBM) T17N, R11E, Sec. 5 (SBM) T16N, R10E (SBM) T15N, R10E, Sec. 14 (SBM)
Mojave	Barstow	Ash Hill Black Ridge Bagdad Obsidianite Field	Flower Agate, Jasper, Chalcedony, Sard Chalcedony Roses, Jasper, Onyx, Perlite, Chrysocolla Obsidianite	T7N, R9E (SBM) T6N, R11E, Sec. 9 (SBM)

Shooting and Hunting

The public lands administered by the BLM in the California Desert have always been important to shooting and hunting. Recreational shooting continues to be a popular activity in the desert. The wide-open and seldom visited areas provide an appropriate place for this activity. Residents from Southern California and Las Vegas often visit the NEMO Routes planning area for target shooting, and bring firearms with them to partake in this activity.

The shooting or discharge of firearms is generally permitted on public lands, except in specified areas including wilderness in the planning area, as long as state and local laws permit such activity. Shooting within ½ mile of structures is forbidden. These activities are regulated in order to minimize conflicts and resource impacts.

The California Department of Fish and Game regulates all hunting in the desert. Hunting activity peaks during the upland game bird season, and occurs at a much lower level at other times. During hunting season, there is an increase in use of motorized vehicles throughout the planning area.

3.3.5 Transportation and Utility Corridors Lands and Realty Actions

Other than major transportation and utility corridors, the planning area contains few developments. The most frequent developments are vehicle access routes for residences and other facilities on private lands, connector utility lines, unauthorized rural dumps, and telecommunications sites. The telecommunications sites are primarily on access routes off of major highways. The dumps tend to be small areas for household items and appliances created by rural residents or campers. No permitted landfills are located within San Bernardino County in the planning area. Two permitted landfills are located within Inyo County. One of these is currently accepting only County highway maintenance materials. The other facility is accepting household wastes under permit from the State.

Portions of three major utility corridors transverse the southern third of the planning area: Corridors R, BB, and D. Corridor R is an east-west corridor, which follows and includes lands adjacent to I-40. This corridor contains a telephone line. Corridor BB is an east-west corridor, three-miles wide, which follows and includes lands adjacent to I-15. Near the Nevada state line, the corridor splits in two, and then rejoins at the Stateline. Major utilities located in this corridor include two 131 KV Alternating Current Transmission Line (Southern Cal Edison), two gas pipelines and two fiber optic cables. This corridor also includes Interstate 15. Utility Corridor D (the Boulder Corridor) is another east-west corridor, roughly parallel to Corridor BB and less than ten miles north of it. Major utilities located in this corridor include one 287 KV and two 500 KV alternating current transmission lines, one 500 KV direct current transmission line, one 40 inch gas pipeline and two fiber optic lines.

3.3.6 Vehicle Access

Access to desert resources by the public occurs for many reasons such as economic, recreation, or transportation purposes. Some access involves the use of major roads, maintained gravel and dirt roads, un-maintained dirt roads, trails and accessible desert washes. Average route density in the NEMO Routes planning area is lower than regions of the CDCA that are closer to major metropolitan areas. In 1985 through 1987, routes were designated in the planning area. These route designations have since been modified by the CDPA and the Fort Irwin National Training Center expansion, which decreased the area of BLM-managed lands subject to a casual public use network, and by CDCA Plan Amendments (NEMO 2002). The existing network is shown on Map 2-4. At the current time, approximately 1,509 miles of routes in the planning area are designated Open, in NEMO (2002) approximately 3.2 miles of routes were designated closed. This does not include routes that were already closed through CDCA Plan Amendment, most likely through ACEC plan route designations prior to 1985 at the Ridgcrest Field Office and prior to 1987 at the Needles and Barstow Field Offices.

The vast majority of motor vehicle users are brought into and through the planning area on a few major artery roads. Primary east-west access is provided by portions of National Trails Highway (Route 66) and Interstate 40 on the southern boundary of the planning area, and Interstate 15 through the southern third of the planning area. The major east-west access through the central portion of the planning area provides visitor access to Death Valley National Park. It consists of State Highway 178 which connects the state line, west through the Tecopa/Shoshone area with SH 190; and SH 190 itself, which runs west from SH 127 through Death Valley Junction and the Furnace Creek area within Death Valley National Park, to Lone Pine just west of the planning area on US 395. Primary north-south access is provided by US395 adjacent to the western boundary of the planning area, US 95 which provides access to the southeastern portion of the planning area, SH 127, which spans the central third of the planning area from Baker on I-15 northward to the state line north of Death Valley Junction, and finally, SH 168 which provides access to the northernmost reaches of the planning area.

The desert topography and geomorphic features present in the northern part of the NEMO Routes planning area limit, and sometimes prevent cross-country access. In a few places, occasional snows, rains and flash floods make routes impassable. Physical limitation (slope aspects, etc.) often provides little flexibility of alternative access to desert resources. Access may involve a single road into an area; while in other areas, particularly at lower altitudes and in valleys, several options may exist for the management of a route network. In the southern part of the planning area, desert topography and geomorphic features are relatively different, represented by broader valleys and more gently sloping mountains. This type of desert terrain provides increased opportunities for motorized vehicle access. This results in additional management pressures when attempting to create an appropriate land management balance between access to and use of the California desert. The central and northern portions of the planning area also include large areas have been congressionally closed to casual vehicle access and/or transferred to another federal agency (i.e., NPS or DOD). They do not currently have adequate boundary markings and turnarounds, as appropriate, to assist the public. To some extent, these are more inaccessible areas, but this is not always the case.

All three of the major utility corridors in the planning area include one or more major maintenance roads along the length of the corridor to access utilities that are located on side routes or within the road right-of-way itself. These major maintenance roads are some of the primary casual public access routes within the route network because they are well maintained and relatively well used.

Some parts of the planning area are within designated critical habitat and Areas of Critical Environmental Concern for threatened and endangered species. Land management planning and implementation, including access networks, must be consistent with the recovery strategies developed for the species.

Organized Competitive Vehicle Events

BLM's Multiple-Use Classification (MUC) guidelines allow for competitive OHV events in OHV Open Areas on public lands. There is one OHV Open Area within the planning area. The CDCA Plan as amended by the Northern and Eastern Mojave Plan (December, 2002) limits competitive events outside of OHV open areas to designated courses. Currently, the only designated courses within the CDCA are outside of the NEMO Routes planning area.

Dumont Dunes Open Area

The Dumont Dunes Recreation Area is located off Highway 127 north of Baker in northeastern San Bernardino County. Surrounding the Dumont Dunes Open Area are several sensitive areas, including the

Kingston Range Wilderness Area and Amargosa River ACEC to the northeast, Death Valley National Park to the west on the other side of Highway 127, and the Salt Creek ACEC to the south. The main Dumont Dunes system, though relatively small, exhibits more types of dunes than any other dune system in the California Desert. This makes for excellent OHV recreational opportunities. Since the 1960s, Dumont Dunes has attracted people to the challenge of dune riding. The recreation area attracts over 122,000 visitors annually, and this number has been increasing in recent years. Most visitors are from southern Nevada and the Los Angeles Basin.

Peak use periods in OHV open areas center around holiday weekends and the “spring break” at colleges. The net effect is a general use period from September through May of each year with the greatest use occurring in September-November and March-April. Use levels are lowest during the summer months, with the exception of holiday weekends. BLM active management presence is generally limited to peak use periods.

Through most of the 1990’s, only one permitted event was held at Dumont Dunes each year--the Las Vegas Jeep Club’s annual event over the President’s Day holiday weekend. This event operates within an area of the main dune system to avoid conflict with unrelated activities. Recently, more commercial activities have been occurring at the dunes. These events include the Suzuki Quadzillathon, an ATV hill climb drag race, and the Dune Riders Sand boarding Competition. This latter event has been held at the dunes for the past three years. This is most likely due to the increase in population in the southwestern Nevada area and proximity of the dunes to Nevada, as well as the decreased acreage and changing nature of riding areas in the Imperial Dunes in recent years.

Dual Sports Events

BLM’s Multiple-Use Classification (MUC) guidelines allow for non-competitive OHV events on designated open routes on public lands, unless routes are specifically limited. Each year, the BLM receives requests for organized touring events and other speed-limited organized motor activities. In response to this recreational demand, the BLM has prepared a programmatic NEPA document with terms and consulted with the USFWS on an organized motorcycle/OHV touring program, or dual-sports events in desert tortoise habitat. To fall under the criteria of the relevant biological opinion (USFWS 1991, as amended in 1995) the event must be non-competitive in nature, occur between November 1 and March 1, occur entirely on existing open routes, and have no more than 500 participants.

The Dual Sport Committee of District 37 of the American Motorcyclist Association applies on a regular basis for a recreation permit for use of existing routes of travel through lands managed by the BLM as part of their Dual Sport National Trail Ride. The LA-B-to-V Dual Sport Trail Ride has been a permitted event since 1984 and is limited to no more than 500 participants. The event involves dualsport and motorcycle touring through the NEMO Routes planning area.

Vehicle Touring

Casual-use vehicle touring is one of the most popular forms of recreation in the NEMO Routes planning area. Vehicle touring overlaps substantially the subject of destination recreation and, in many cases, other forms of access. Vehicle touring may be for its own sake (the view, relaxation, to get to know the country, etc.) or it may be related to rock and mineral collection, bird watching, equestrian use, technical OHV touring, historical trail use, wind-driven vehicle use, camping, hunting and hiking. Small informal group events occur on a regular basis throughout the planning area. Their use levels are currently

unknown. Occasionally route proliferation is associated with route widening to avoid difficult passage areas, intersection shortcutting, and visitation to some of the historic mining areas or other interesting locations off the beaten path.

Technical 4-Wheel Drive Touring

The technical 4-wheel drive touring routes generally receive relatively little permitted and other casual recreational use. These are challenging routes for desert touring and exploration. Travel is difficult and rough because there are fewer routes, they are generally steeper and require higher clearance vehicles for passage; include areas that have difficult soils for traction and/or large rocks, and none are maintained.

Historical Trail Touring

The off-road vehicle experience of traveling historical routes (Table 3-8) provides an educational and scenic experience of the natural wonders of a harsh desert region and the elements that the pioneers and founders of the historical route had to endure. Much of the Old Spanish Trail (Mormon Road) has been paved within the NEMO Routes planning area. Tracks of the trail can still be seen at Emigrant Pass just off the Old Spanish Trail Highway as well as at Impassable Pass at the Alvord Mountains and points west. The route leading west from the highway is closed to motorized vehicles to preserve what remains of the Old Spanish Trail. Variations of this route were traveled from 1829 to 1848, all being called the Spanish Trail, making it difficult to trace the original route. Most of the route in California is also known as the Mormon Road and became a commercial trade route between Los Angeles and Salt Lake City.

A portion of Route 66, “Old National Trails Highway,” forms the southern boundary of the NEMO Routes Planning area. Route 66 was designated in 1926 and was the Main Street of America. It was the first national highway to connect Chicago with Los Angeles and was known as the “Mother Road.” By 1985 however, the federal government deleted Route 66 from the Federal Highway System. Today, Interstate 40 has replaced some of the route in the Mojave Desert. Route 66 still offers travelers an interesting touring opportunity. The recent revival of Route 66 and the fact that more than 80% of the original route is still open has lead to a substantial increase in travelers.

From 1905 to 1940, the Tonopah & Tidewater railroad ran from Ludlow to Goldfield, Nevada, and parallels the Amargosa River for a portion of its length in California. The line was very important for the mines, mining companies, residents and employees, even though it never financially flourished. The T&T railroad line was the fastest, shortest, and cheapest route to Los Angeles and San Francisco for all the towns and mines along the Amargosa River and Death Valley regions. The T&T railroad was abandoned and dismantled in the 1940's. Three historic crossings occurred in the high water flow segment of the river between Shoshone and Sperry siding. In order to preserve what remains of the original route, the remnant berm north from Sperry to its junction with the California/Nevada border has been closed to motorized vehicle use, and a pedestrian trail now exists on the T&T railroad, which is breached in many areas between Shoshone and Sperry siding. However, there are adjacent roads along the berm providing vehicular access for most of its length. There is a stretch through wilderness and just north of the wilderness to Tecopa that is only passable on foot through the canyon. The route adjacent to the berm is open to motorized vehicles from Sperry south to Riggs.

Table 3-8. Major Historical Trails in the NEMO Routes Planning Area

Name	Miles	Miles On Public Land ^a	Resource Values
East Mojave Heritage Trail	650	38 miles open from Rocky Ridge to Fenner. 61 miles from Needles to Ivanpah. 97 miles from Ivanpah to Rocky Ridge.	Scenic, historical, Native American values.
Old Spanish Trail/Mormon Road	1,200	50 miles – California border to Ft. Irwin Military boundary	Scenic, historical, Native American values
Route 66	2,400	Approx. 30 miles – Section between Ludlow and Kelbaker Road	Scenic, historical
Tonapah and Tidewater Railroad	160	75 miles – 20 miles open from Riggs to Sperry	Scenic, historical

^a Miles on Public Land represent miles in the NEMO Routes planning area only.

3.4 Special Designations

Special designations in the planning area include twelve Areas of Critical Environmental Concern (ACEC), three rivers found eligible for potential inclusion in the National Wild and Scenic River System, and numerous wilderness and wilderness study areas.

3.4.1 Areas of Critical Environmental Concern

Table 3-9 shows BLM ACEC within the NEMO Routes planning area. These ACEC provide some of the most concentrated areas of sensitive resources as well as interesting resource-oriented recreation on public lands.

Table 3-9. Areas of Critical Environmental Concern (ACEC) in the NEMO Routes of Travel Planning Area

Name	Field Office	Acres ^a	Resource Values
Amargosa River ACEC	Barstow	19,000	Wildlife habitat, vegetation, outstanding scenery, riparian
Bigelow Cholla RNA	Needles	83	Botanical values
Cerro Gordo	Ridgecrest	9,073	Prehistoric and historic values, vegetation
Denning Spring	Barstow	465	Prehistoric and historic values
Halloran Wash	Needles	1,743	Prehistoric values
Kingston Range	Barstow Needles	19,620	Wildlife habitat
Mesquite Hills Crucero	Barstow	5,002	Prehistoric values
Mesquite Lake	Needles	6,731	Prehistoric values
Mt. Pass Dinosaur Trackway	Needles	628	Historic and paleontological values
Saline Valley	Ridgecrest	1,389	Wildlife habitat
Salt Creek (Dumont)	Barstow	2,205	Wildlife habitat, prehistoric values
White Mountain City	Ridgecrest	32	Cultural and historical values

^a Acres computed using Geographic Information System and include all public lands and private inholdings

Most ACECs have their own management plans, and many of these management plans include route designations within their boundaries. These route designations were taken into consideration in this effort, based on the goals of the particular ACEC. They may be modified in some instances under the various alternatives, based on the same goals as for other routes, with the proviso that consistency with ACEC Plan goals or resource conflicts need to also be examined.

3.4.2 Wild and Scenic Rivers

After completion of the 1980 CDCA Plan, regulations were published in 43 CFR 8350 (7 FR 173, Sept. 7, 1982) addressing designation of waters for the National Wild and Scenic Rivers Systems on public lands. The first step in this process is to identify what river(s) segment(s) are eligible for designation. In the NEMO Proposed Plan and FEIS (July 2002) identified segments of three rivers, the Amargosa River, Cottonwood Creek and Surprise Canyon Creek as eligible for the National Wild and Scenic Rivers System. The process for designation and consideration of the Amargosa River, including its three eligible segments, are further described in Appendix O; Cottonwood Creek and its eligible segment is further described in Appendix S, and Surprise Canyon Creek and its segments are described in Appendix T of the NEMO Proposed Plan. Eligible Wild and Scenic Rivers must be maintained until evaluated for suitability as Wild and Scenic Rivers.

Access through Surprise Canyon is being evaluated through a separate process. The Amargosa Canyon/Grimshaw Lake Natural Area ACEC provides multiple resource and recreational values in the planning area. Both areas are also currently designated as national Watchable Wildlife Sites. The Amargosa Canyon/Grimshaw Lake Natural Area ACEC are listed on numerous maps, as well as in several guidebooks and are near a “snowbird” winter use camping area located at Tecopa Hot Springs. Wild and Scenic corridor route use includes hiking, mountain biking (non-wilderness portions), and casual equestrian use, and adjacent vehicular touring. Cottonwood Creek currently receives relatively light recreational use. Unlike Amargosa Canyon, the main wild and scenic corridor route is currently open to vehicular use.

3.4.3 Wilderness

The NEMO Routes planning area encompasses all or portions of 23 areas of designated wilderness totaling approximately 1 million acres and 8 wilderness study areas totaling approximately 200,000 acres. Wilderness and wilderness study areas are congressionally designated. The Northern and Eastern Mojave (NEMO) planning area has the highest concentration of designated wilderness of any region in the contiguous U.S.

BLM manages designated wilderness and wilderness study areas within the NEMO Routes planning area, including access into those areas, consistent with the California Desert Protection Act (CDPA) of 1994, the administrative instruments (regulations, policies, etc.) from that statute, and other applicable federal statutes. These instruments identified management direction for these lands with respect to specific uses that may occur within wilderness, as well as overall goals for lands designated. Passage of the California Desert Protection Act has withdrawn the mineral deposits and potential areas from mineral entry and development in designated wilderness areas, except for valid existing rights. Access is provided to grazing lessees necessary to manage their allotments, and is usually spelled out in the terms of the lease or an allotment management plan. Congressional intent was clear that wilderness designations not lead to the creation of “buffer zones” around wilderness boundaries. In many cases, existing roads were chosen as boundaries to wilderness areas. In and of themselves, non-wilderness activities visible or audible from wilderness are not to be precluded up to such boundaries. Each wilderness and its values are described in

detail in the BLM Wilderness Booklet - October 1994, available for review at all Bureau field offices within the California Desert District.

In addition, portions of the planning area were withdrawn December 28, 2001 from most public uses and access to provide for the expansion of the Fort Irwin National Training Center, which is located north of Barstow. The total area affected in the planning area is approximately 50,000 acres. It is currently anticipated that mining at the iron deposit northwest of Baker will be able to continue, although it is now part of the Fort Irwin military withdrawal. A Record of Decision outlining limitations on public use and access is anticipated in the near future.

3.5 Regional Socioeconomic Considerations

A report to the California Biodiversity Council by the California Department of Forestry and Fire Protection prepares periodic statewide population forecasts. These forecasts are developed and updated by the Demographic Research Unit of the California State Department of Finance. A single estimate for the state, counties, and major cities is developed based on an extrapolation of the most recent (1997) available data and a specific package of methodologies and assumptions. The economic recession during the mid 1990s produced a number of unexpected changes in the domestic migration that required a significant lowering in future population projections in the most recent estimates. Since counties are the smallest unit for standard population projections, county boundaries rather than the bioregional boundaries were used to define populations of the bioregions for the analysis. In this statewide comparison of population by bioregions defined by county boundaries and the smaller census blocks, the most significant difference found was the shift in residents out of the true South Coast bioregion to the Mojave (San Bernardino and Riverside counties) and the Central Coast (Ventura). The San Joaquin Valley population also increases with the inclusion of portions of the Delta and the Sierra Nevada. With this general growth trend as background, a more focused look at the region in question follows.

The population in the NEMO Routes planning area includes a substantially higher percentage of rural residents than either the high desert (HD) or Southern California and Southwestern Nevada (SCN). The planning area is within the eastern half of San Bernardino County and eastern and southeastern Inyo County, with a very small tip in southeastern Mono County. In general, the area is sparsely populated. In the northern part of the planning area is the village of Shoshone with a population of 52, where public and emergency services are available. The community of Baker is located in the westerly portion of the planning area along Interstate 15 and has a population of approximately 464 within a 2-mile "metro" area. Baker services travelers along Interstate 15, particularly those traveling to Las Vegas. Immediately outside the southeastern part of the planning area is the City of Needles, located near Interstate 40 on the banks of the Colorado River.

Some residents in the Needles area live in the most southeasterly portion of the planning area and population density is approximately 35 people per square mile over the adjacent 26 square miles immediately northeast of Needles including the small area within the NEMO Routes planning area. By contrast, population density within remaining rural areas of the planning area ranges from a high of up to 7 persons per square mile in northern Inyo County to less than 1 person per square mile in the majority of the three counties in the planning area, with an overall average of approximately 2 persons per square mile². The overall rural composition is translated into longer average commutes to work than areas with higher urban populations. The routes of travel network serve as connectors to primary County, State, and Federal highways that serve as the main commuter routes. The major urban centers or clusters in the

² US Census, 2000, Census Summary Files, By State, by County, 100% Data, by 5-digit zip code-

Planning Area and HD, their populations, and growth rates in the most recent decade (1990-2000) include the towns in Table 3-10.

Table 3-10. High Desert Region Population Centers

Locality (CA unless Otherwise Indicated)	Population (1990)	Population (2000)	% Change (1990-2000)
Las Vegas, NV ^a	697,348	1,314,357	+88.5
Ridgecrest city	27,725	24,927	-10.1
Pahrump, NV CDP ^b	7,424	24,631	+231.8
Bishop city	3,475	3,575	+2.9
Laughlin, NV CDP ^b	4,791	7,076	+47.7
Needles city	5,191	4,830	-7.0
Searles Valley (Trona Area) CDP	n/a	1,885	n/a
Sandy Valley, NV CDP ^b	n/a	1,804	n/a
Lone Pine	1,818	1,655	-9.0
Independence CDP ^b	n/a	574	n/a
Baker CDP (within the planning area) ^b	n/a	464	n/a
Olancho CDP ^b	n/a	134	n/a
Tecopa CDP (within the Planning Area) ^b	n/a	99	n/a
Keeler CDP ^b	n/a	66	n/a
Shoshone CDP(within the Planning Area) ^b	n/a	52	n/a
Furnace Creek CDP ^b	n/a	31	n/a
Entire Planning Area^c	26,758	n/a	n/a

^a Urban area, which includes immediately adjacent cities and unincorporated areas outside of incorporated city limits.

^b And immediate vicinity. CDP stands for Census Designated Place and denotes a density settled area that is not an incorporated place. As of the 2000 census, no minimum size exists for CDPs; in 1990 all incorporated towns and CDPs of approximately 2,500 and above were included.

^c For Planning Area estimates, Inyo County (Co.) includes the Death Valley (#7), Block Groups (BG) 1 and 2 of the Independence (#5), and BG 1 of the Lone Pine (#6) Co. Subdivisions; San Bernardino Co. includes the Newberry-Baker Co. Subdivision & Tract 105, BG 1 of the Needles Co. Subdivision. The calculation excludes the small Southern Mono Co. portion of the Planning Area because the smallest census tract includes a much larger area than is within the NEMO Routes of Travel Planning Area, and the relative population in the NEMO Planning Area portion is very low.

As the table indicates, towns and cities in western Nevada, in particular, have been undergoing substantial population growth. This is not just a recent trend. While there has been slow growth over the past century in Inyo County, the following table of regional population trends illustrates towns in some adjacent counties, and in particular, those in western Nevada, and to a lesser extent, San Bernardino County, have shown a long-term growth trend since prior to 1950. A similar, growth trend is also

occurring in some other urban areas of Southern California. The information in Table 3-11 can be used to assist in projecting future vehicular use and demands, and anticipating management needs in the planning area.

As is noted in the latest (2003) census figures showing population changes in the last 3 years, these growth trends are continuing. Nevada is currently growing faster than any other state in the nation, with most of that growth in the southwestern portion of the state. California shows the highest absolute population totals and the 9th fastest population growth in the nation. Population growth in both states is primarily focused in certain fast growing middle- and large-sized urban centers and associated bedroom communities.

Table 3-11. Planning Area Region Population Changes by decade, 1970-2000

County	1970	1980		1990		2000	
	Total	Total	Percent Change	Total	Percent Change	Total	Percent Change
Mono	4,016	8,577	114	9,956	16	12,853	29
Inyo	15,571	17,895	15	18,281	2	17,945	-2
San Bernardino	682,233	895,016	31	1,418,380	58	1,709,434	21
Clark (NV)	273,288	463,087	69	741,459	60	1,375,765	86
Nye (NV)	5,599	9,048	62	17,781	97	32,485	83
State							
Nevada	488,738	800,508	64	1,201,833	50	1,998,257	66
California	19,971,069	23,667,764	18	29,760,021	25	33,871,648	14

Average incomes and major cost-of-living expenses (e.g., average housing costs) overall in the planning area are lower than the HD or SCN, which is typical of areas with more rural populations. Within the NEMO Routes planning area there is a substantial range in average incomes with the highest incomes in the very northern and northeastern portion of the planning area. However, that has not translated into more vehicles in the driveway on average in these areas. Within the planning area, the average resident has 1.5-1.9 vehicles, and has to own a primary vehicle that can navigate through the area where they live. However, within the larger urban areas of the HD and SCN, the average number of vehicles increases by almost one. Some of the additional vehicles may be off-highway vehicles or recreational vehicles for access into backcountry areas such as the East Mojave routes of travel network.

Another factor that may have an economic effect on the routes of travel network is changing land ownership patterns. The recent expansion of the Fort Irwin National Training Center (NTC) (2001) is anticipated to result in more limited public access in the long-term, within the expanded NTC boundaries. These effects are not readily quantified, and NTC has indicated that access will be provided to ongoing operations on a case-by-case basis. Some valid existing rights may be purchased or activities and associated routes may continue for the life of the permits. On the other hand, the expansion may increase NTC job access to residents in the NEMO Routes planning area.

Recent land exchanges on BLM-managed lands to consolidate public land ownership in more remote areas have resulted in improved public access in these areas and the elimination of easement needs.

Likewise, areas exchanged to private interests adjacent to freeways and highways could either have more limited or more improved (upgraded) access, particularly as properties are developed.

The route of travel network is being developed for casual use activities. However, subsequent consideration of permitted activities with future access that is not part of the designated route network, if there are more miles of new access route to build, could become more expensive. The cost of doing business, including environmental surveys, and potentially, consultation with federal and state biological and cultural agencies in order to get a permit or approved plan, is moderately to substantially higher for undisturbed ground than existing routes. For previously closed routes, it would depend on the reason for the route closure, the amount of rehabilitation that has occurred (current disturbance levels), and other factors. Cost of doing business for closed routes may be similar to those for open or limited routes or costs may be somewhat higher.

Travel, dining and recreation services also contribute a significant portion of the economies to small towns within the planning area (Runyan and Associates 1998). However, no quantitative studies have been completed in the East Mojave to determine what portion of visitors are driving-through the area or accessing their destinations using major roads, and how many are using the routes of travel network of the East Mojave. The majority of visitors are spending their dollars in towns on major artery routes adjacent to the planning area, on freeways, and at gateways to major destinations, due to the current overall low level of infrastructure services off of primary routes, with a few notable exceptions.

Likewise, several Native Americans reside or have tribal interests in the HD, including a tribe that resides within the Death Valley National Park which is surrounded by the NEMO Routes planning area on three sides. In addition, Native Americans have tribal lands within and adjacent to the planning area, some of which is currently undeveloped and some of which has been developed for reservation gaming open to the public. The majority of visitors to these gaming facilities are primarily spending their dollars at the gaming facilities and in adjacent towns, but the visits may also provide an opportunity for exploration of the area served by East Mojave routes of travel.

There are also internal agency benefits and costs associated with routes of travel designation, including those associated with increased closures, signage, or enhanced maintenance. The economic effects of the routes of travel network on resources and recreation management ultimately are borne by the public. Likewise, the benefits to resources and access are costs foregone by the public. These are addressed under the specific resource values analyzed for the proposed action and alternatives in Chapter 4, and will be further addressed with the development of the implementation plan in terms of the values provided by management strategies selected.